

Rec'd PCT/PTO 26 MAY 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

10/536633

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
10 June 2004 (10.06.2004)

PCT

(10) International Publication Number  
WO 2004/048555 A1

(51) International Patent Classification<sup>7</sup>: C12N 5/02, 15/01

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(21) International Application Number:

PCT/AU2003/001573

(22) International Filing Date:

26 November 2003 (26.11.2003)

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(30) Priority Data:

2002952944 27 November 2002 (27.11.2002) AU

(84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



WO 2004/048555 A1

(54) Title: RESTORATION OF METHYLATION STATES IN CELLS

(57) **Abstract:** A method for altering a characteristic or state of a cell, or reprogramming a cell, comprising treating a first cell type with an agent capable of altering a characteristic or state in a cell or reprogramming a cell, and determining the degree of alteration of the treated cell by measuring the methylation signature within the genome of the treated cell, wherein a given methylation signature is indicative of an altered characteristic or state of the treated cell. The preferred substance for treating the first cell is a cellular extract, lysate or component from a second cell type, the second cell type having a desired characteristic, or being the desired cell type the first cell type is to be reprogrammed to. The examples show the methylation state of a fibroblast cell being reprogrammed to that of an immune system T cell.